Newsletter

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Kyoto University-University of Malaya

Kyoto University Global COE Program
Global Center for Education and Research on
Human Security Engineering for Asian Megacities

Kyoto University
Graduate School of Engineering

Special Coordination Funds for Promotion Science and Technology
Strategic Program for Fostering Environmental Leaders
International Center for Human Resource Development in
Environmental Management

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The JSPS Asian Core Program (IWM) Steering Committee Meeting III held in Court Room, Chancellery, University of Malaya (July 16, 2012).

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Water Forum was held in Seminar Room 1, Research Management & Innovation Complex (RMIC) organized by Governance Group (G4), JSPS Asian Core Program (Integrated Watershed Management) (June 25, 2012).

University of Malaya-Kyoto University program is an international program under:

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Kyoto University Global COE Program
Global Center for Education and Research on Human Security Engineering for Asian Megacities

A Study on Seismic Design for Infrastructures in a Low Seismicity

Prof. Sumio Sawada
Laboratory of Dynamics of Foundation Structures, Disaster Prevention Research Institute, Kyoto University

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Department of Urban Management, Kyoto University

Research location:
Kuala Lumpur, Malaysia
Research term:
July 2009– Sept. 20092012

Message from supervisor:

Dr. Sherliza Zaini Sooria entered the doctoral course of Kyoto University in order to study a design seismic ground motion for seismic design standard in Malaysia. I assigned her researches, not only for ground motion but also for earthquake response of structure, in order to understand the full process of seismic design. She has studied very hard, collected the real data and analyzed the response of an existing bridge during earthquakes. She has finally proposed a new seismic design concept in a low seismicity region like Malaysia and obtained PhD.

Introduction and objective:

Evidence of seismic hazard in Malaysia due to distant seismic sources in Indonesia and the Philippines, and ground motions within the country is sufficient to warrant a serious consideration for seismic resistant design for structures, particularly bridges, which are important lifelines. This research is an attempt to act in line with Malaysia's spirit to improve the nation's preparedness against unpredictable earthquake events, to secure the public safety, and to address the issues related to seismic risk due to lack of seismic resistance in structures. We have selected the Samudera Bridge, located in Kuala Lumpur, to undergo seismic simulation and study its behavior under the excitation of the 1995 Kobe, 1940 El Centro, and 2005 Sumatera earthquake. The main objective is to determine a suitable design motion for bridges in Malaysia.

We have conducted data collection activities in Malaysia, which included, among others, gathering of ground motion records from the Malaysian Meteorological Department; acquiring and studying the structural drawing of the Samudera Bridge from the Public Works Department (PWD); understanding of the bridge geometrical background, and gathering appropriate design standards, currently used for designing bridges and viaduct structures in Malaysia; and searching of local literatures on faults within the country.

Figure 1 En. Abd. Rahman Salleh (left), Mr. Lee Choon Siang and En. Azmilhizam (right) who gave great support during the internship program

Figure 2 Search for research data i.e. bridge drawings and project background from file storage, and drawing cabinet

Results and Discussion

We conducted seismic simulation using the nonlinear static pushover (NSP) analysis and dynamic analysis in a finite element framework software called Open Sees (2009). Observation of damage during dynamic analysis indicates that bridge piers are heavily damaged in both the transverse and longitudinal directions. However, from NSP analysis the seismic coefficient for these piers in the transverse direction is as high as 0.57, but only having a low displacement capacity of 100 mm (maximum).

Thus, it can be deduced that for a low seismicity region, such as Malaysia, the seismic coefficient is less important to consider during the design of a bridge. We have investigated a suitable displacement capacity for design by assessing the maximum magnitude earthquake within inland Malaysia, which will result in surface rupture. Considering historical data of 136 years, the maximum magnitude earthquake observed in Malaysia is 6.5M_b. By using the Dahle *et. al* (1990) attenuation model, it can be predicted that for a shallow earthquake at 5 km depth, the peak ground acceleration (PGA) is 135 gal. To estimate peak ground displacement (PGD), we employed the Si and Midorikawa (1999) attenuation model to first estimate the peak ground velocity (PGV). This model was used because it accounted for near source data well into its model. The estimated PGV was 60 cm/s, and assuming that damage will occur predominantly at 1.5 seconds (as observed during the Kobe earthquake), the PGD is estimated as 150 mm. As a result, we have recommended that structures in Malaysia should be designed to allow a maximum displacement of 150 mm to en-

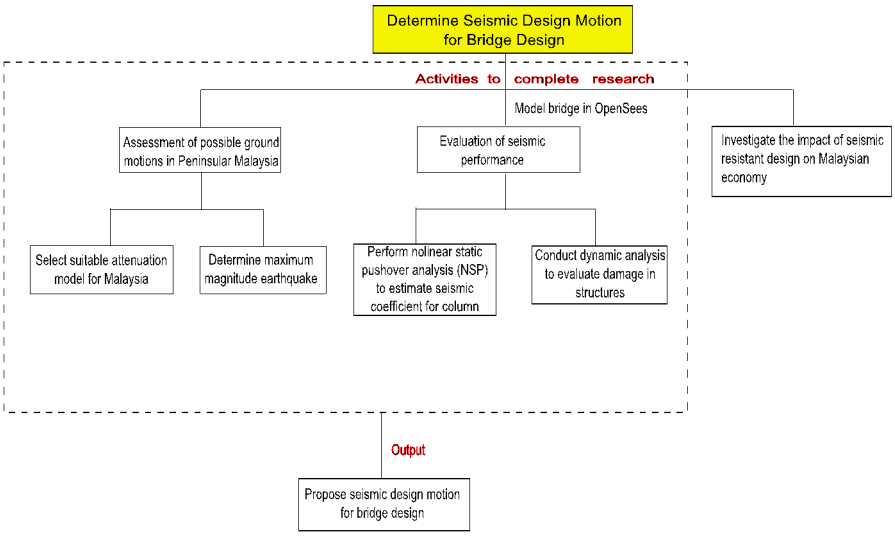


Figure 3 Study flow diagram

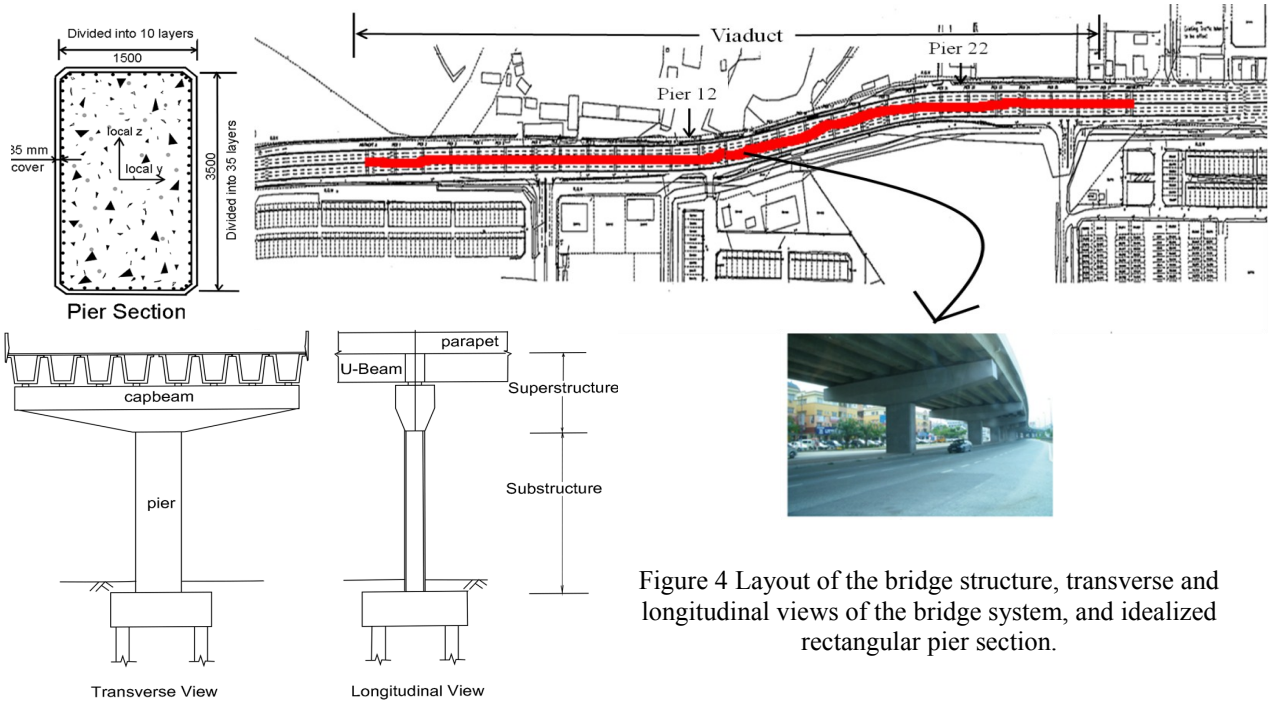


Figure 4 Layout of the bridge structure, transverse and longitudinal views of the bridge system, and idealized rectangular pier section.

Conclusion or/and Future Plan

The Malaysian government has embarked on seismic hazard research for Malaysia since 2003 to address the issues of safety, following several reports of felt motion in building structures due to earthquakes from distant seismic sources. In parallel to the government's effort, the Public Works Department of Malaysia (PWD) has collaborated with academicians of local universities to investigate the vulnerability of public buildings in Malaysia. In addition, PWD has been working on formulating suitable seismic design forces for use in the design of structures in Malaysia.

Special Coordination Funds for Promotion Science and Technology
Strategic Program for Fostering Environmental Leaders
International Center for Human Resource Development in Environmental Management
Environmental Manegement Leader Program

Community-based Heritage Conservation in George Town, Penang

Associate Professor Hirohide Kobayashi
Graduate School of Global Environmental Studies

Sia May Ching
Laboratory of Global Environmental Architecture

Research location:
Georgetown, Pulau Pinang, Malaysia
Research term:
3 Nov 2011– 3 February 2012

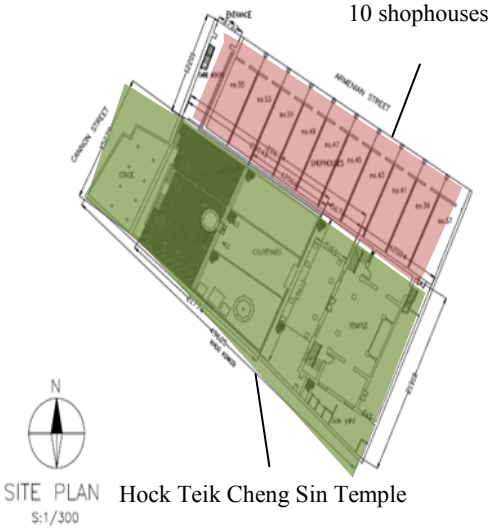
Message from supervisor:
The conservation of heritage buildings has always encountered difficulties due to the complicated conditions and multiple factors, although heritage buildings are well known to possess the high potential of historical, cultural and economic values. Bottom-up conservation may be one effective approach in recent years that involves community participation and therefore takes community views into consideration. The community-based conservation project in George Town is a challenging and timely trial to find the adequate conservation methods between a heritage owner and tenants. Ms. Sia May Ching is studying such conservation approach for her upcoming master's thesis, based on her internship experience in George Town.

Research-Introduction and objective:

The city of George Town faced a huge decrease in its local community with the repeal of Rent Control Act in 2000. The Rent Control Act kept the rents low to protect its inhabitants but it was a great disadvantage to landowners. The repeal of Rent Control Act led to a gentrification of the local community to the outskirts as many lands were sold off to developers. In 2008, the designation of George Town as a World Heritage Site contributed to the further increase in land prices. With the generation of economic profits with the massive markets for tourism activities, it is inevitable that tourism development should happen. However, the original community was at risk of displacement since they could not afford the further increase in rents.

Community participation conservation project was proposed by Think City to ACHR and introduced to the communities in George Town as a pilot project, to include communities in conservation and hence provide housing security to the local communities. (Think City is a federal linked agency to fund and revitalize George Town, Asian Coalition of Housing Rights is an NGO based in Thailand) In April 2001, this project was proposed to the Hock Teck Cheng Sin Temple, owner of 10 adjacent shophouses in Armenian Street. A year was spent in talks, workshops and a study trip to Thailand to identify how the project is to proceed, as well as to improve the relationship among tenants, and also between tenants and committee members of the temple. Two major needs were identified- tenancy security and improvement of physical condition of the houses.

I was involved in the project through my internship at BK Ooi Architect, a design and heritage consultation company in Penang. I partook in the preparation of the dilapidation report and conducted visits to the houses to take pictures and had short interviews with the tenants on their houses and their wishes as well as worries about this project.



Hock Teik Cheng Sin Temple

Results and Discussion

The relationship among tenants, and between tenant and owner has improved by leaps and bounds compared to prior to this project a year ago. The workshop, where the tenants visited each others' house to identify the places to be repaired, had brought the neighbours closer. For many, it was the first time they visited their neighbours' places and had no knowledge of the conditions of their neighbouring houses although they lived just a few doors away.

Through the meeting between owner in November 2012, tenants, Hock Teck Cheng Sin Temple, coordinators of Think City and ACHR, it seemed all stakeholders were optimistic and eager to proceed with the project. Out of the 8 tenants, two would not be involved in this project- one due to the high restoration costs in his house (the whole second floor has been infested with termites), and the other was a subtenant with no legal tenancy agreement with Hock Teck Cheng Sin Temple. The tenants who attended the meeting raised fears and voiced hopes that they are assured housing security.


Condition in some of the houses in Armenian Street

Some of the houses are in dilapidated condition. Among the main recurrent problems observed in the 10 houses are termite problems, roof leaks, gutter problem, septic tank etc. The proposed conservation measures include taking considerations of the tenants as they are most aware of the nook and cranny of their own dwellings and would be the ones staying there until at least the next decade. In preparing the dilapidation report before tender works, we talked to the tenants and took pictures of the places needed to be repaired or restored. The completed report was then shown to the tenants and temple committee members to get approval from all parties.

The construction tender process is completed in May 2012 and restoration process would begin soon after. Restoration work at the 10 shophouses is to be undertaken by the same contractor. Since tenants would be living in the houses during the whole construction period, much consideration would be given to ensure their minimal living comfort is maintained.

Meeting between tenants, temple committee, ACHR and Think City

Community architect explaining the contents of the completed dilapidation report

Conclusion or/and Future Plan

There is much to look forward to in this pilot project. Unlike the conventional top-down ongoing conservation process which stresses more on physical conservation of buildings, a bottom-up conservation process like the Armenian Street project would place more considerations on the needs of local communities. According to one study, (Lim 2008) residents in George Town are split in half on the decision to whether conserve the city or not. If this pilot project goes well, other communities in George Town would have more confidence in such projects. A commercial city would certainly be good for tourism, however, it exudes fakeness, and loses the appeal of the original colorful community living in George Town.

As a further development of the Armenian Street project, other similar conservation project in other cities in the world where the local community is involved is studied. A fieldwork which comprises interviews of stakeholders will be conducted in August 2012 to get a feedback on the ongoing work, as well as to obtain an idea of the thoughts and feelings of the local community in this project.

References:

Y.M Lim (2008): George Town as a Heritage City: The Voices of the Residents
H.S.Chang (2000): Shophouse: Development of Shophouse in Malaysia and Singapore- Flexibility of its Space and Sustenance of Use

Water Forum

Water Forum was held in Seminar Room 1, Research Management & Innovation Complex (RMIC), University of Malaya on 25th of June 2012. All of the JSPS Asian Core (Integrated Watershed Management) Malaysian members were invited. The forum was divided into 2 sessions, session 1 moderated by Dr. Zeeda Fatimah Mohamad (9.30 am to 11.00 am) with 4 speakers: En. Marzuki bin Mohammad from National Water Services Commission (SPAN) and En. Muhammad Ridzuan Arshad from Federal Department of Town and Country planning (JPBD); one research institute - Dr. Zati Sharip from the National Hydraulic Research Institute of Malaysia (NAHRIM); and one NGO - Mr Vincent Ngoo from Water Association of Selangor (SWAn). Session 2 was moderated by Dr. Goh Hong Ching (11.30 am to 1.40 pm) with another 4 speakers: Tn. Hj. Md Khairi Selamat from Lembaga Urus Air Selangor (LUAS), Dr. Wan Mohd Yusof Wan Chik from Universiti Sultan Zainal Abidin (UNISZA), Prof. Datin Dr. Azizan Baharuddin from Institut Kefahaman Islam Malaysia (IKIM) and Prof. Dr. Jamilah Mohammad from Univesity of Malaya (UM).

Above: *The Water Forum flyers*

Above:
A) Dr. Zeeda Fatimah in the middle among the session 1 speakers from SWAn, NAHRIM, SPAN and JPBD (left to right). B) Dr. Goh Hong Ching in the middle among session 2 speakers form LUAS, UNISZA, IKIM and UM (left to right).

Right:
C) The discussion session among all of the Governance Group (G4) members after the forum was held, chaired by Prof. Datin Dr. Azizan Baharuddin (the Group leader). D) The Governance Group (G4) members in the discussion session.

Water Forum

The forum in total gathered 8 speakers from various organizations dealing with issues of water governance in Malaysia. The presentation titles are as follow:

Table 1: Water forum speakers and presentation titles

No.	Speaker	Organization	Presentation title
1.	Dr. Zati Binti Sharip Research Officer	Pusat Kajian Kualiti Air & Alam Sekitar, Institut Penyelidikan Hidraulik Kebangsaan Malaysia (NAHRIM)	Sustainable Management of Lakes & Reservoir in Malaysia
2.	Mr. Marzuki Bin Mohammad Executive Director	Jabatan Kawal Selia Air Suruhanjaya Perkhidmatan Air Negara (SPAN)	Water Services in Malaysia – Reforms and Challenge
3.	Mr. Muhammad Ridzuan Bin Arshad Deputy Director	Bahagian Penyelidikan & Pembangunan, Jabatan Perancangan Bandar & Desa	JPBD'S Initiatives Towards Watershed Management
4.	Mr. Vincent Ngoo SWAn Member	Water Association of Selangor, Kuala Lumpur & Putrajaya (SWAn)	Deteriorating Raw Water Quality At Water Intakes Due To Pollution
5.	Tn. Hj. Md. Khairi Selamat Director	Lembaga Urus Air Selangor (LUAS)	Water Resource Management in Selangor
6.	Dr. Wan Mohd Yusof Wan Chik Lecturer	Fakulti Pengajian Kontemporari Islam Universiti Sultan Zainal Abidin (UNISZA)	Water Usage: Target & Management Principles according to Islam
7.	Prof. Datin Dr. Azizan Baharuddin	Institut Kefahaman Islam Malaysia (IKIM)	Water from IKIM Perspective
8.	Prof. Dr. Jamilah Mohammad Professor	University of Malaya (UM)	Say What You Do and Do What You Say: Managing or Governing Watershed?

The distinguished speakers revealed the different dimensions of water issues: best practices in lake management, regulatory aspects of water services, the role of town and country planning in water governance and the issue of water pollution. The session was also invaluable in updating the research members on the current national and state level data, trends, policies & regulatory options and initiatives pertaining to water governance in Malaysia. This forum also revealed the different dimensions of water discussion: as a subject and object, structural and non -structural ideas, from local to global, as well as from the secular and religious perspectives. The two sessions of Water Forum provided an overview of 'who is doing and thinking what' among the stakeholders involved in watershed management which is essential to JSPS-ACP Governance Group to proceed with the research and to approach the local people on the ground. As a whole it has been a very fruitful session, especially to kick-off the brainstorming session on what type of research that we need to carry out under the JSPS-ACP Governance Group.

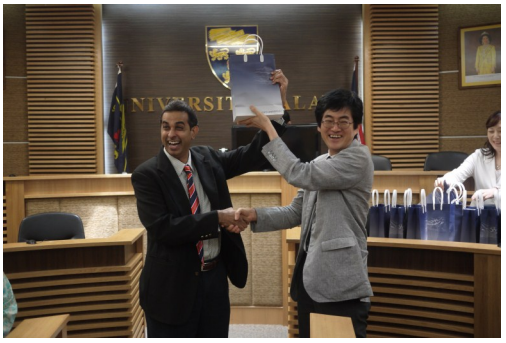
JSPS Asian Core (Integrated Watershed Management): Steering Committee Meeting III

The Steering Committee Meeting 3 was held in Court Room, Chancellery, University of Malaya (July 16, 2012). The agenda of the meeting discussed the present circumstances of fiscal year 2012 (April 2012 to March 2013) and each group research proposal. The participants of the meeting from both Malaysia and Japan:

Participants of Malaysian side:

Prof. *Nik Meriam Nik Sulaiman,* Coordinator, UM
Prof. *Zulkifli Yusop,* Leader of Group 1, UTM
Prof. *Mazlin Mokhtar,* Leader of Group 3, UKM
Prof. *Datin. Azizan Baharuddin,* Leader of Group 4, UM
Prof. *Jamilah Mohammad,* Member of Group 4, UM
Prof. *Salmaan Inayat Hussein,* Member of Group 2 and 3, UKM
Dr. *Muhamad Ali Muhammad Yuzir,* Member of Group 2, UTM
Dr. *Faridah Othman,* Member of Group 2, UM
Dr. *Noor Zalina Mahmood,* Member of Group 4, UM
Dr. *Goh Choo Ta,* Member of Group 3 and 4, UKM
Mr. *Azizi Abu Bakar,* Research Officer, UM
Mr. *Yazlie Aizat,* Research Assistant, UM

Apologies:
Prof. *Hamzah Hj. Abdul Rahman,* Deputy Vice-chancellor, UM
Prof. Md. *Ghazaly Shaaban,* Leader of Group 2, UM
Pn. *Nor Zaherah,* Deputy Registrar, UM
Pn. *Jamiah Mohamad,* Official, UM



Participants of Japanese side:

Prof. *Yoshihisa Shimizu*, Coordinator, KU
Prof. *Minoru Yoneda*, Leader of Group 3, KU
Prof. *Masahisa Nakamura*, Leader of Group 4, Shiga University
Assoc. Prof. *Hiroshi Yamamoto*, Member of Group 3, Tokushima University
Dr. *Kazunobu Kojima*, Program Leader, KU
Dr. *Sunmin Kim*, Sub-Program Leader, KU
Dr. *Nobumitsu Sakai*, Researcher, Member of G3, KU
Mr. *Seiji Suzuki*, Director, KU
Mr. *Yuki Inoue*, Sub-Chief, KU
Ms. *Miki Nishii*, Official, KU

(Room S-519, Uji-campus, KU, via teleconference system)
Prof. *Eiichi Nakakita*, Leader of Group 1, KU
Mr. *Yasuhiro Yoshida*, Section Chief, KU

JSPS Asian Core (Integrated Watershed Management): Steering Committee Meeting III

The details of the selected watersheds were discussed as follow:

Target Watersheds in Malaysia

1. Selangor river basin
2. Langat river basin
3. Johor river basin

Research Proposal

1. Geographical information/characteristics in target watersheds
2. Research background in target watersheds
3. Research objectives and scheme in target watersheds
4. Significance of proposed study and expected outcome
5. Educational scheme/output (for young researchers) through this program





***Above**: Visit to UM-Kyoto University Program new office (left). Dinner at Enak KL, Starhill Gallery (right).*

***Left:** Visit and observation at Sg. Selangor located at Kg. Kuantan, Kuala Selangor.*

***Right:** Visit to Bukit Melewati, Kuala Selangor.*

Occurrence of bisphenol A in surface water, drinking water and plasma from Malaysia with exposure assessment from consumption of drinking water

Mustafa bin Ali Mohd
Shimadzu_UMMC Centre of Xenobiotic Studies, Department of Pharmacology, Faculty of Medicine, University of Malaya

Nobumitsu Sakai
Department of Environmental Engineering, Graduate School of Engineering, Kyoto University

Research location:
University of Malaya
Research term: August 14 – December 11, 2011

Message from supervisor:
The distribution of BPA in Malaysian environment is very much depending on the locations and type of activities in the locality. It is not much documented in literature. This study attempted to analyze the distribution of BPA as a whole in various matrices such as river water, tap water, wastewater and even in human plasma. The study is important as it will help to map out the distribution of this chemical in the environment and also calculated the risk to the population as this chemical is a known endocrine disruptor.

Research-Introduction and objective:
Bisphenol A (BPA) is a monomer used extensively in the production of polycarbonate, epoxy resins and as a non-polymer additive in plastics such as polyvinyl chloride (PVC) and water pipes, whereas BPA has been suggested as an endocrine disruptor and its health risk assessment is indispensable. In this study, we analyzed BPA level in river water used as potable water supply and also collected samples from outlets of municipal sewage treatment plants, industry and wet market to assess the pollution load from these sources. Furthermore, BPA levels in tap water, bottled water with poor storage condition and blood plasma of adults from selected communities were studied with the aim of assessing the potential human exposure from these sources. Finally, these quantitated data was used to assess health risk of local population by BPA exposure.

Results and Discussion
BPA was detected in 93% of river water samples and upstream sites showed lower BPA level than downstream sites where the highest concentration was 215 ng/L. The sample collected near outlets of municipal sewage treatment plants, industry and wet market had higher BPA level compared to the river water samples and their highest concentration was 1218 ng/L. These results would suggest that industrial, domestic and sewage effluents are important anthropogenic sources of BPA. Fig. 1 shows BPA level in tap water samples. Samples 6 and 24 collected from taps fitted with filter devices and sample 12 collected from a tap connected with PVC pipe had the highest BPA levels at 56.4, 59.8 and 47.1 ng/L, respectively. Meanwhile, mean BPA level from the other 27 samples collected from taps without filter or PVC fittings was 9.6 ng/L, suggesting that contamination of supplied water from these devices. While water passing through PVC hose was previously reported to be contaminated by BPA, contamination from filter devices deserves further investigation as its usage is popular especially in the urban areas of Malaysia. Levels of BPA in mineral water bought off the shelf (storage temperature, 25 °C) and after storage at 50 °C for 3 days to simulate improper storage were quantitated to assess the BPA contamination from the plastic (PET) bottles. Samples stored at room temperature had lower levels of BPA (3.3±2.6 ng/L) compared to those stored at higher temperature (11.3±5.3 ng/L) with significant difference detected between the mean levels. While plasticizers such as BPA and phthalates are not necessary for the manufacturing of PET bottles, this result suggested that BPA would be contaminated from the PET bottles possibly due to recycle usage of them which may contribute BPA contamination, according to previous studies. Furthermore, BPA was detected in 17% of the plasma samples at levels ranging from 0.81 to 3.65 ng/mL, as shown in Table 1. This finding suggested that unconjugated BPA was circulated in the blood despite most of the BPA is rapidly metabolized by first-pass glucuronidation and eliminated in the urine. Finally, these quantitated data was applied to health risk assessment for Malaysian people by intake of BPA through consumption of drinking water. The highest BPA levels detected was used as a worst case scenario. An adult Malaysian (weighing 60 kg) consuming 2 L of tap water or drinking water in a day was estimated 2.0×10^{-3} µg/kg and 7.3×10^{-4} µg/kg of daily BPA intake. Compared to 50 µg/kg of tolerable daily intake (TDI) defined by USEPA, these estimated levels were negligible. Nevertheless, further studies would be required to scrutinize other sources of BPA as BPA was detected in blood plasma from local population.

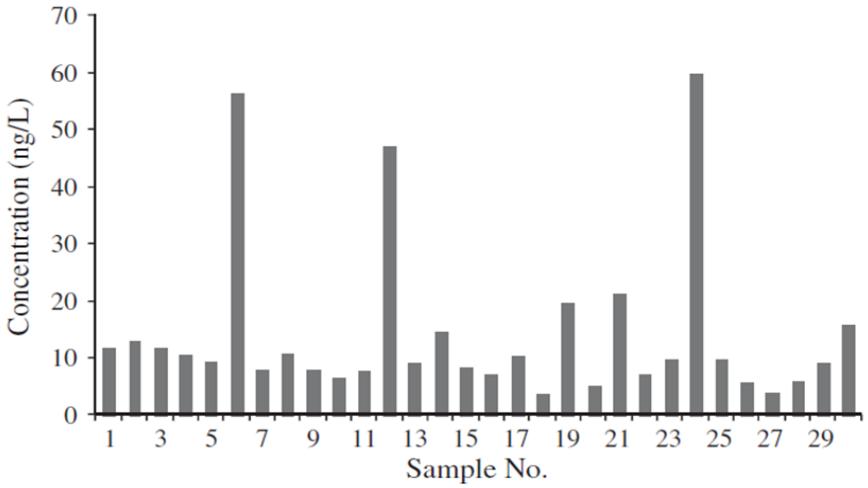


Fig. 1 BPA levels (ng/L) detected in drinking water collected from household taps.

Table 1: Number of blood plasma samples detected BPA in Malaysian local population.

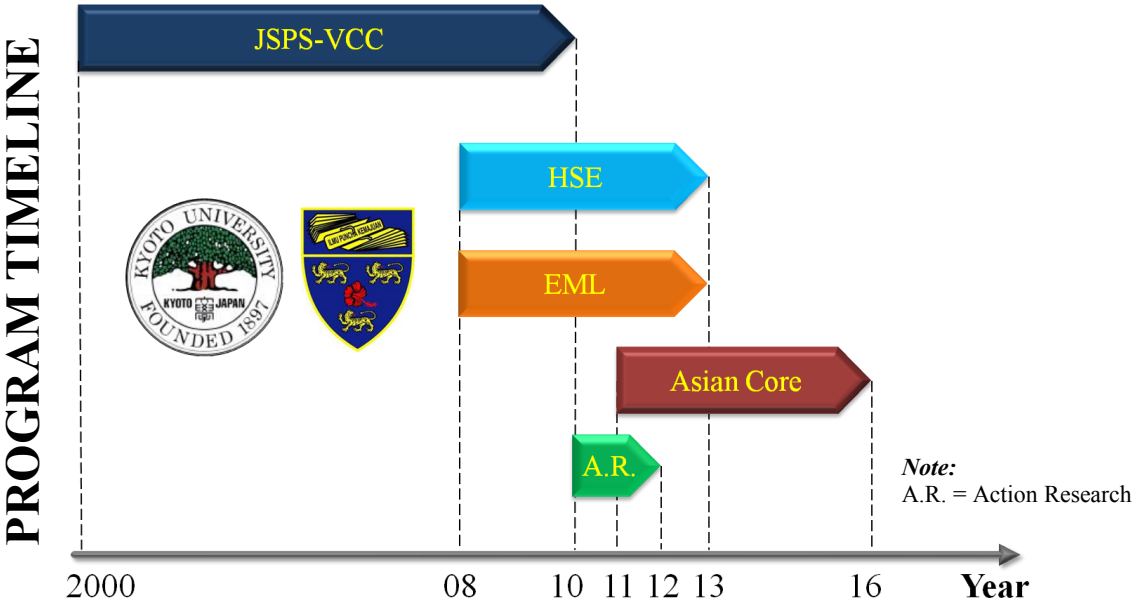
Range (ng/mL)	Number of samples		Percentage (%)
	Male	Female	
Not detected	38	46	83
<1.00	1	1	2
1.00–1.99	1	2	3
2.00–2.99	4	3	7
≥3.00	2	3	5

Conclusion or/and Future Plan

This study demonstrated that BPA is a ubiquitous contaminant in Malaysian river water with likely sources from industry and sewage treatment plants. One of serious environmental problems in Malaysia is garbage disposal and many insanitary landfill/dumping sites still exist which can contribute BPA discharge into river. Thus, further water quality analyses are indispensable for securing healthy life of local population. Low levels of BPA were detected in tap and bottled mineral water which increased slightly in poorly stored condition. It was much lower than TDI and negligible in terms of health risk for local population. However, as higher BPA level was detected in certain tap water samples, BPA might be highly contaminated from conventional systems like PVC pipes and hotspots as shown above. Since we collected the tap water samples in only urbanized areas (Kuala Lumpur and its suburbs), other rural regions would be necessary to investigate the BPA pollution. On the other hand, 17% of blood plasma samples in Malaysian adults had detectable levels of BPA level, though the level was very low. Therefore, the negligible BPA level in water would indicate that there can be other exposure routes of BPA. Overall, BPA pollution still needs to be scrutinized as a concerned issue.

Remarks

This study was supported by JSPS Asian CORE Program and Ministry of Higher Education, Malaysia. Through this program, Kyoto University and University of Malaya collaborated to conduct this cooperative research. I would like to take this opportunity to give my acknowledgment to both Environmental Risk Analysis laboratory in Kyoto University and SUCXeS laboratory in University of Malaya. At the same time, I do expect that further cooperative research will flourish through this program towards integrated watershed management in Malaysia.



Programs and its duration under international collaboration between Kyoto University and University of Malaya

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